

(b) Amendments to the claims

Cancel claims 1-9.

10. (WITHDRAWN) A method for producing the battery separator of claim 1 which comprises the steps of

- (a) preparing a dry blend of between 4wt % and 99 wt % of an ultra high molecular weight polyethylene having an average molecular weight of 1×10^6 or more and between 1% and 96% of a TiO_2 particulate filler with average particle size diameter of between $0.001 \mu\text{m}$ and $10 \mu\text{m}$;
- (b) mixing the dry blend with between 40wt % and 90 wt % plasticizer in an extruder, forming a solution;
- (c) extruding the solution through a film die, creating an extruded film;
- (d) calendering the extruded film at between 30°C and 120°C ;
- (e) removing the plasticizer by the extraction method;
- (f) uni-axially or bi-axially stretching the film at between 110°C and 130°C at a stretching ratio of 2 or more in the transverse direction, the machine direction, or both; and
- (g) heat-setting the film at between 110°C and 130°C .

11. (WITHDRAWN) A microporous battery separator having a thickness of between $5 \mu\text{m}$ and $175 \mu\text{m}$, a porosity of between 30wt % and 95 wt %, and an air permeability of between 5 sec/10cc and 200 sec/10cc, said microporous membrane comprising a ultra high molecular weight polyolefin having a minimum average molecular weight of 1×10^6 , a low molecular weight polyethylene with an average molecular weight of between 700

and 4500, and a TiO₂ particulate filler with an average particle size diameter of 0.001 to 10 μm .

12. (WITHDRAWN) A battery separator in accordance with claim 11, wherein said microporous membrane is comprised of between 1wt % and 90 wt % ultra high molecular weight polyethylene, 1wt % and 90 wt % low molecular weight polyethylene and 1wt % and 90 wt % TiO₂.

13. (WITHDRAWN) A battery separator in accordance with claim 11 or 12 having shutdown temperatures of between 95°C and 135°C.

14. (WITHDRAWN) A battery separator in accordance with claim 11 or 12 having melt integrity of 165°C or more.

15. (WITHDRAWN) A battery separator in accordance with claim 11 or 12 having a puncture resistance of more than 300 grams/25 μm .

16. (WITHDRAWN) A battery separator in accordance with claim 11 or 12 wherein said separator is used in a non-aqueous electrolyte battery.

17. (WITHDRAWN) A battery separator in accordance with claim 11 or 12 wherein said separator's surface is treated with a substance chosen from the group consisting of (a) a wetting agent and (b) a hydrophilic grafting agent, for use in an aqueous electrolyte battery.

18. (WITHDRAWN) A method for producing a battery separator which comprises the steps of:

(a) preparing a dry blend of between 1wt % and 90 wt % of an ultra high molecular weight polyethylene having an average molecular weight of 1×10^6 or more, between 1wt % and 90 wt % low molecular weight polyethylene with average molecular weight of

between 700 and 4500, and between 1 wt % and 96 wt % of a TiO_2 particulate filler with an average particle size diameter of 0.2 μm or less;

(b) mixing the dry blend with between 40wt % and 90 wt % plasticizer in an extruder,

(c) extruding the solution through a sheet die producing an extruded film thereby;

(d) calendering the extruded film at between 70°C and 120°C;

(e) uni-axially or bi-axially stretching the film at between 80°C and 120°C at stretching ratio of 2 or more in the transverse direction, the machine direction, or both;

(f) removing the plasticizer by an extraction method; and

(g) heat-setting the film at between 70°C and 100°C.

19. (WITHDRAWN) A battery which comprises the battery separator in accordance with claim 1.

20. (WITHDRAWN) A battery which comprises the battery separator in accordance with claim 11.

21. (WITHDRAWN) A microporous filter which comprises the microporous membrane in accordance with claim 1.

22. (WITHDRAWN) A microporous filter which comprises the microporous membrane in accordance with claim 11.

Cancel claim 23.

24. (WITHDRAWN) A battery separator comprising a microporous membrane having a thickness of 5 to 175 μm , a porosity of between 30% and 95%, and an air permeability of between 1 sec/10cc and 100 sec/10cc, said microporous membrane comprising a blend of between 70% and 95% of two polyethylene polymers (consisting of between 3% and 20 weight % of an ultra high molecular weight polyethylene polymer having an average

molecular weight of 2×10^6 or higher and between 80% and 95 % of polyethylene polymer having an average molecular weight of 1×10^6 or lower), and 5% to 30% of a TiO_2 particulate filler with an average particle size diameter of between 0.001 μm and 1 μm .

25. (WITHDRAWN) A battery separator comprising a microporous membrane having a thickness of 5 to 175 μm , a porosity of between 30% and 95%, and an air permeability of between 1 sec/10cc and 100 sec/10cc, said microporous membrane comprised between 70% to 95 weight % mixture of two polyethylene polymers (consisting of between 30% and 90 weight % ultra high molecular weight polyethylene having an average molecular weight of 1×10^6 or higher and between 10% and 50 % low molecular weight polyethylene having an average molecular weight of 4,500 or lower), and between 5% and 30% a TiO_2 particulate filler with an average particle size diameter of between 0.001 μm and 1 μm .

26. (Currently Amended) The battery separator in accordance with claims ~~23, or 24, or 25~~ 37, 38, 39, or 40, having melt integrity of ~~+65°C~~ 200°C or more.

27. (Currently Amended) The battery separator in accordance with claims ~~23, or 24, or 25~~ 37, 38, 39, or 40, and further having a shutdown temperature of ~~+30°C plus or minus~~ 20°C between 100°C and 200°C.

28. (Currently Amended) The battery separator in accordance with claims ~~23, or 24, or 25~~ 37, 38, 39, or 40, and further having a puncture resistance of more than 300 grams/25 μm .

29. (Currently Amended) The battery separator in accordance with claims ~~23, or 24, or 25~~ 37, 38, 39, or 40, and further having a thermal shrinkage of 10% or less both in the machine and transverse directions.

Cancel Claim 30.

31. (Currently Amended) A membrane in accordance with claims ~~23, or 24, or 25~~ 37, 38, 39 or 40, wherein said membrane comprises a surface, and said surface is treated with a substance chosen from the group consisting of (a) a wetting agent and (b) a hydrophilic grafting agent.

32. (Currently Amended) A battery separator in accordance with claim ~~23~~ 37, 38, 39 or 40, wherein said separator has an average pore diameter of between 0.01 μm and 1 μm .

33. (WITHDRAWN) A battery separator in accordance with claim 24 wherein said separator has an average pore diameter of between 0.01 μm and 2 μm .

34. (WITHDRAWN) A battery separator in accordance with claim 25 wherein said separator has an average pore diameter of between 0.01 μm and 2 μm .

Cancel claims 35.

36. (WIHDRAWN) A filter which comprises the battery separator in accordance with claims 23, or 24, or 25, or 31.

37. (NEW) A battery separator comprising a microporous membrane having a thickness of 5 to 175 μm , and a porosity of between 50% and 75%, said microporous membrane comprised of between 85% to 95 % by weight of an UMHW polyethylene having a minimum average molecular weight of 1×10^6 , and between 5% and 15 % by weight of a TiO_2 particulate filler with an average particle size diameter of between .001 μm and 1 μm .

38.(NEW) A battery separator comprising a microporous membrane having a thickness of 5 to 175 μm , and a porosity of between 50% and 75%, said microporous membrane consisting of between 85% and 95 % by weight of UMHW polyethylene having a

minimum average molecular weight of 1×10^6 , and between 5% and 15 % by weight of a TiO_2 particulate filler with an average particle size diameter of between .001 μm and 1 μm .

39. (NEW) The battery separator in accordance with claim 37, having an air permeability of between 1 sec/10cc and 30 sec/10cc.

40. (NEW) The battery separator in accordance with claim 38, having an air permeability of between 1 sec/10cc and 30 sec/10cc.